

WHAT IS CLAIMED IS:

1. A system for controlling an internal combustion engine having a plurality of cylinders and mounted on a vehicle, comprising:

5 an engine operation controller that conducts a switching control of engine operation based on a load of the engine between a full-cylinder operation in which all of the cylinders are operative and a cut-off cylinder operation in which some of the cylinders are inoperative; and

a running controller that conducts a running control of the vehicle;

10 wherein the engine operation controller switches engine operation to the full-cylinder operation when it is determined that deceleration is required by the running controller.

15 2. A system according to claim 1, wherein the running controller conducts the running control that includes at least one of a cruise control in which the vehicle runs at a desired vehicle velocity and a preceding vehicle follow-up control in which the vehicle runs at a desired vehicle velocity to maintain a desired inter-vehicle distance from a preceding vehicle.

20 3. A system according to claim 1, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when a device that is manipulated by an operator to input the instruction to decelerate the vehicle is kept manipulated for a
25 predetermined period of time or more.

4. A system according to claim 2, wherein the engine operation controller

determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when a difference between a detected vehicle velocity and the desired vehicle velocity is equal to or greater than a predetermined value.

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5. A system according to claim 2, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when change of the desired vehicle velocity is equal to or greater than a predetermined value.

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6. A system according to claim 2, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation if change of the desired vehicle velocity is equal to or greater than a predetermined value when the preceding vehicle follow-up control is in progress.

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7. A system according to claim 1, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when a gradient of a road on which the vehicle runs is equal to or less than a predetermined gradient threshold value.

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8. A system according to claim 1, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation if a throttle valve is fully closed or is almost

fully closed when the running control is in progress.

5 9. A system according to claim 1, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when an accelerator pedal is not manipulated by an operator.

10 10. A system according to claim 1, wherein the engine operation controller determines that deceleration is required by the running controller and switches engine operation to the full-cylinder operation when a supply of fuel to the engine is cut off.

15 11. A system according to claim 1, wherein the engine operation controller switches engine operation to the cut-off cylinder operation when it is determined that deceleration is not required by the running controller, after switching engine operation to the full-cylinder operation.

20 12. A method of controlling an internal combustion engine having a plurality of cylinders and mounted on a vehicle, comprising the steps of:

25 conducting a switching control of engine operation based on a load of the engine between a full-cylinder operation in which all of the cylinders are operative and a cut-off cylinder operation in which some of the cylinders are inoperative; and

 conducting a running control of the vehicle;

 wherein the step of engine operation control switches engine operation to the full-cylinder operation when it is determined that deceleration is required by the step of

running control.

5 13. A method according to claim 12, wherein the step of running control conducts the running control that includes at least one of a cruise control in which the vehicle runs at a desired vehicle velocity and a preceding vehicle follow-up control in which the vehicle runs at a desired vehicle velocity to maintain a desired inter-vehicle distance from a preceding vehicle.

10 14. A method according to claim 12, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when a device that is manipulated by an operator to input the instruction to decelerate the vehicle is kept
15 manipulated for a predetermined period of time or more.

 15. A method according to claim 13, wherein the step of engine operation control determines that deceleration is required by the step of running control and
20 switches engine operation to the full-cylinder operation when a difference between a detected vehicle velocity and the desired vehicle velocity is equal to or greater than a predetermined value.

25 16. A method according to claim 13, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when change of the desired vehicle velocity is equal to or greater than a predetermined value.

17. A method according to claim 13, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation if change of the desired vehicle velocity is equal to or greater than a predetermined value when the preceding vehicle follow-up control is in progress.

18. A method according to claim 12, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when a gradient of a road on which the vehicle runs is equal to or less than a predetermined gradient threshold value.

19. A method according to claim 12, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation if a throttle valve is fully closed or is almost fully closed when the running control is in progress.

20. A method according to claim 12, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when an accelerator pedal is not manipulated by an operator.

21. A method according to claim 12, wherein the step of engine operation control determines that deceleration is required by the step of running control and switches engine operation to the full-cylinder operation when a supply of fuel to the

engine is cut off.

5 22. A method according to claim 12, wherein the step of engine operation control switches engine operation to the cut-off cylinder operation when it is determined that deceleration is not required by the step of running control, after switching engine operation to the full-cylinder operation.